



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,852	04/12/2004	Masakatsu Maeda	251428US90	1750
22850	7590	12/31/2007	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			FEELY, MICHAEL J	
ART UNIT		PAPER NUMBER		1796
NOTIFICATION DATE		DELIVERY MODE		12/31/2007 ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)
	10/821,852	MAEDA, MASAKATSU
	Examiner Michael J. Feely	Art Unit 1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 15 October 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-4 and 6-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4 and 6-8 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
6) Other: _____.

DETAILED ACTION

Pending Claims

Claims 1-4 and 6-8 are pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 and 6-8 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Takemiya et al. (US Pat. No. 6,372,351).

Regarding claims 1, 3, 4, 6, and 8, Takemiya et al. disclose: (1) an epoxy resin composition for semiconductor encapsulating (column 2, lines 3-35) comprising: an epoxy resin (column 2, line 49 through column 6, line 22), a phenol resin (column 6, lines 22-49), an inorganic filler (column 9, lines 5-35), a curing accelerator (column 6, line 50 through column 7, line 22), and a carbon precursor (column 7, lines 23-44; column 8, line 41 through column 9, line 5), and wherein the amounts of the inorganic filler and the carbon precursor in the epoxy resin composition are respectively 65-92 wt% (column 9, lines 30-35) and 0.1-5.0 wt% (column 8, line 63 through column 9, line 5); (3) wherein the carbon precursor is fine particles having an average particle diameter of 0.5-50 μm (column 8, lines 56-62); (4) wherein the carbon precursor is fine particles having an average particle diameter of 0.5-20 μm (column 8, lines 56-62); (6) wherein

the amount of the inorganic filler in the total amount of the epoxy resin composition is 70-91 wt% (column 9, lines 30-35); and (8) a semiconductor device comprising a semiconductor element encapsulated using the epoxy resin composition for semiconductor encapsulating according to any one of claims 1-4, 6 and 7 (column 2, lines 3-35).

Takemiya et al. do not explicitly disclose: (1) a carbon precursor having a specific electric resistivity in a semiconductor region of $1 \times 10^4 \Omega\text{-cm}$ or more but *not more than* $1 \times 10^6 \Omega\text{-cm}$. Rather, they disclose that the resistivity is 10^7 or above (*a relatively less conductive material*), wherein the amount used is preferably 0.1 to 10% (*see column 8, line 41 through column 9, line 5*). The quantity range includes the entire instantly claimed range of from 0.1-5.0 wt%.

In light of this, one of ordinary skill in the art would have expected that the use of 5.0 wt% (*upper limit of claimed range*) of a carbon precursor having a resistivity of 10^7 (*outside instantly claimed range; relatively lower conductivity*) would have had a similar overall effect on the composition as the use of (values below 5.0 wt%, and particularly) 0.1% (*lower limit of claimed range*) of a carbon precursor having a resistivity of 10^6 (*limit of instantly claimed range; relatively higher conductivity*). When considering the weighted effect of these materials within the allowed quantities, the difference between the use of a relatively low amount of relatively higher conductivity material and the use of a relatively high amount of relatively lower conductivity material, would have been negligible. Such a negligible difference would have rendered the instantly claimed composition obvious over the prior art.

Therefore, the instantly claimed composition would have been obvious over the composition of Takemiya et al. because: although the carbon precursor of Takemiya et al. is less

conductive than the carbon precursor of the instant invention, the weight effect of these materials within the allowed quantity range would have been negligible, rendering the instantly claimed composition obvious over the prior art. Specifically, the difference between the use of a relatively low amount of relatively higher conductivity material and the use of a relatively high amount of relatively lower conductivity material, would have been negligible.

Regarding claim 7, Takemiya et al. disclose the use of calcined materials produced at similar temperatures (*see column 7, lines 23-44*); however they fail to explicitly disclose: (7) wherein the carbon precursor is produced by carbonizing *a phenol resin* at a calcination temperature of 600-650°C. It should be noted that this is a product-by-process limitation (*see MPEP 2113*), wherein calcination (high temperature baking) thermally decomposes carbon-based materials to a product essentially comprising carbon. In light of this, it appears that the baked precursor of Takemiya et al. would have been the same or an obvious variation of the instantly claimed calcined precursor.

Therefore, it appears that the baked precursor of Takemiya et al. would have been the same or an obvious variation of the instantly claimed calcined precursor because both are baked at similar temperature ranges, resulting in a thermal decomposition of the carbon-based materials.

Regarding claim 2, the rationale set forth above regarding claim 7 obviously satisfies the limitation of claim 2 as well: (2) wherein the carbon precursor has an H/C ratio by weight determined by elemental analysis of 2/97 to 4/93. The calcination (high temperature baking) conditions would appear to dictate the degree of thermal decomposition and final H/C weight ratio of the calcined material.

Therefore, it appears that the baked precursor of Takemiya et al. would have been the same or an obvious variation of the instantly claimed calcined precursor because both are baked at similar temperature ranges, resulting in a thermal decomposition of the carbon-based materials.

Response to Arguments

3. Applicant's arguments filed October 15, 2007 have been fully considered but they are not persuasive. Applicant argues that the newly amended resistivity range overcomes the prior art of record. Furthermore, they argue that the resistivity range of the Takemiya et al. would have led to problems, as detailed in Applicant's Comparative Examples 5 & 6.

Regarding the Comparative Examples, they demonstrate the ill effects of materials having resistivity values of 10^9 and 10^{10} . The prior art includes resistivity values as low as 10^7 . Accordingly, the Comparative Examples fail to demonstrate poor performance of the prior art. Furthermore, the Comparative Examples fail to demonstrate where the critical threshold is for the claimed resistivity value. Throughout the specification, 10^7 is indicated as the critical threshold; however, this value was not isolated in the examples. As discussed in the previous Office action, Applicant shows acceptable results when using materials having a resistivity of 10^4 and 10^6 (*see Examples 1-3*). This is in contrast to poor results when using materials having resistivities of 10^8 , 10^9 , and 10^{10} . However, there are no results representing the use of materials having a resistivity of 10^7 . Without this showing, it would be expected that resistivity values of 10^6 would have the same or obvious effect as resistivity values of 10^7 (*prior art*).

With respect to the current amendment, the instant invention remains obvious over Takemiya et al. for the new reasons set forth above.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

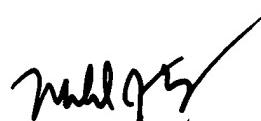
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Michael J. Feely
Primary Examiner
Art Unit 1796

December 21, 2007

**MICHAEL FEELY
PRIMARY EXAMINER**